

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method for generating mid and long wavelength infrared radiation, comprising the step of:

pumping a tunable optical parametric oscillator with the output of a laser-pumped optical parametric oscillator pumped with seeded pumping energy, the laser-pumped optical parametric oscillator having a stable resonator and an output beam of a sufficiently narrow line width to enable production of the mid and long wavelengths, said line width being less than 5 nanometers.

2. (Cancel)

3. (Currently amended) The method of Claim ~~2~~ 1, wherein the ~~pumping laser-pumped~~ optical parametric oscillator is non-colinearly phase matched to provide the narrow line width beam.

4. (Currently amended) The method of Claim 3, and further including the step of pumping the ~~pumping laser-pumped~~ optical parametric oscillator with a narrow line width source of pumping energy.

5. (Cancel)

6. (Currently amended) The method of Claim 4, ~~and further including wherein~~ the step of seeding the pumping energy ~~with~~ for the laser-pumped optical parametric oscillator includes a

6. (Currently amended) The method of Claim 4, ~~and further including wherein~~ the step of seeding the pumping energy ~~with~~ for the laser-pumped optical parametric oscillator includes a seed having energy corresponding in wavelength to one of the wavelengths at which the ~~pumping laser-pumped~~ optical parametric oscillator lases.

7. (Currently amended) The method of Claim 6, wherein the one wavelength is that associated with the signal of the ~~pumping laser-pumped~~ optical parametric oscillator.

8. (Previously amended) The method of Claim 1, wherein the output that pumps the tunable optical parametric oscillator includes 5 micron energy.

9. (Original) The method of Claim 8, wherein the line width of the 5 micron energy that pumps the tunable optical parametric oscillator is less than 5 nanometers.

10. (Original) The method of Claim 1, wherein the tunable optical parametric oscillator is tunable between 5 and 20 microns.

11. (Currently amended) A method of providing sufficient pumping energy to pump a tunable optical parametric oscillator so that it is tunable to produce an output between 5 and 20 microns, comprising the step of:

pumping the tunable optical parametric oscillator with an output from a ~~pumping laser-~~
pumped optical parametric oscillator that is non-colinearly phase matched, has a stable resonator

parametric oscillator being of a line width less than 5-~~nanometers~~ nanometers to effectively pump the tunable optical parametric oscillator.

12. (Canceled)

13. (Currently amended) The method of Claim 11, wherein the tunable optical parametric oscillator includes a CdGeAs₂ nonlinear crystal, wherein the ~~pumping laser-pumped~~ optical parametric oscillator includes a ZGP nonlinear crystal, and wherein the seeding pumping energy is from an HeNe 3.39 micron source.

14. (Currently amended) A system for generating coherent infrared energy in a band from 5-20 microns, comprising:

a tunable optical parametric oscillator having an output tunable from 5-20 microns; and,

~~A pumping a laser-pumped optical parametric oscillator having a stable resonator, a pumping laser, and a seeding source coupled to the output of said pumping laser, said laser-pumped optical parametric oscillator having~~ an output beam coupled to said tunable optical parametric oscillator and ~~of~~ a line width less than 5 nanometers to effectively pump said tunable optical parametric oscillator.

15. (Currently amended) The system of Claim 14, wherein said ~~pumping laser-pumped~~ optical parametric oscillator is non-collinearly phase matched.

16. (Cancel)

17. (Currently amended) The system of Claim ~~16~~ 14, wherein said tunable optical parametric oscillator includes a CdGeAs₂ nonlinear crystal and wherein said ~~pumping laser-pumped~~ optical parametric oscillator includes a ZGP nonlinear crystal.

18. (Currently amended) The system of Claim ~~71~~ 17, wherein said seeded pumping source includes a HeNe laser.

19. (Original) The system of Claim 18, wherein said ~~seeded pumping seeding~~ source includes a Ho:YLF laser.

20. (Currently amended) A method for generating mid and long wavelength infrared radiation, comprising the step of:

pumping a tunable optical parametric oscillator with the pumping energy from a ~~pumping laser-pumped~~ optical parametric oscillator pumped by a pumping laser having an output seeded with the output of a seeding laser, the laser-pumped optical parametric oscillator having a stable resonator and ~~having~~ an output of a sufficiently narrow line width to enable production of the mid and long wavelengths, the narrow line width established by seeding the pumping energy to the laser-pumped optical parametric oscillator with energy corresponding in wavelength to one of the wavelengths at which the ~~pumping laser-pumped~~ optical parametric oscillator lases.

21. (Cancel)
22. (Currently amended) The method of Claim ~~21~~ 20, wherein the ~~pumping laser-pumped~~ optical parametric oscillator is non-colinearly phase matched.
23. (Currently amended) The method of Claim 22, and further including the step of pumping the ~~pumping laser-pumped~~ optical parametric oscillator with a narrow line width source of pumping energy.
24. (Previously added) The method of Claim 23, wherein the line width of the source of pumping energy is less than 5 nanometers.
25. (Currently amended) The method of Claim 20, wherein the one wavelength is that associated with the signal of the ~~pumping laser-pumped~~ optical parametric oscillator.
26. (Previously added) The method of Claim 20, wherein the tunable optical parametric oscillator is pumpable with 5-micron energy.
27. (Previously added) The method of Claim 26, wherein the line width of the 5 micron energy that pumps the tunable optical parametric oscillator is less than 5 nanometers.

28. (Previously added) The method of Claim 20, wherein the tunable optical parametric oscillator is tunable between 5 and 20 microns.

29. (New) A method of providing sufficient pumping energy to pump a tunable optical parametric oscillator so that it is tunable to produce an output between 5 and 20 microns, comprising the step of:

pumping the tunable optical parametric oscillator with an output from a pumping optical parametric oscillator that is non-collinearly phase-matched and is pumped with seeded pumping energy, the output of the pumping optical parametric oscillator being of a line width less than 5 nanometers to effectively pump the tunable optical parametric oscillator, the tunable optical parametric oscillator including a CdGeAs₂ non-linear crystal, the pumping optical parametric oscillator including a ZGB non-linear crystal, the seeding pumping energy being from an HeNe 3.39-micron source.

30. (New) A system for generating coherent infrared energy in a band from 5-20 microns, comprising:

a tunable optical parametric oscillator including a CdGeAs₂ non-linear crystal having an output from 5-20 microns; and,

a pumping optical parametric oscillator including a ZGP non-linear crystal having an output beam coupled to said tunable optical parametric oscillator and of a line width less than 5 nanometers to effectively pump said tunable optical parametric oscillator.

31. (New) The system of Claim 30, wherein said seeded pumping energy includes energy from a source that includes a HeNe laser.

32. (New) The system of Claim 31, wherein said seeded pumping energy includes energy from a Ho:YLF laser.